

# **Building Services Fundamentals and Environmental Performance**

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## Module Descriptor

Module Code: BSE4BSF  
Version: V1.00  
Status: Final  
Date: 25/03/2026

## Summary Module Details

### Module details

**Module Title:** Building Services Fundamentals and Environmental Performance

**Module Leader:** Dr Jackie Portman

**Module Mode:** Supported online learning

**Semester:** Autumn (UK) and Spring (UK)

**Level:** 4

**Credits:** 20 Hours

**Learning Hours:** 200

### Contact & Study Hours

**Directed Study Time:** 90 hrs (45%)

**Self-directed Study Time:** 50 hrs (25%)

**Assessment Study Time:** 60 hrs (30%)

### Assessment Type

**Coursework:** 80%

**Computer Marked Assessment:** 20%

## Module Summary

This module introduces the core principles and professional context of building services engineering while exploring the environmental design criteria that underpin occupant comfort and system efficiency. Students will examine thermal comfort, lighting, air quality, acoustics, and how the building fabric influences performance. Systems for mechanical, electrical, and public health services are introduced, alongside basic numerical methods for quantifying comfort and energy-related variables (e.g., temperature, illuminance, airflow, heat gains, U-values, lux levels).

The importance of integrated design, health and safety, and industry standards is emphasised, with students also learning to interpret and evaluate building services drawings. By the end of this module, students will understand how environmental design and system performance combine to deliver safe, sustainable, and high-quality internal environments.

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As the introductory ('landing') module for the programme, it is designed to bring students to a common baseline of understanding across scientific, environmental, and engineering principles, regardless of prior experience

## Taken on which Programmes

CertHE Building Services Engineering (C)

Core (C) or Elective (E)

## Module Aims

This module aims to:

- Introduce the core principles and professional context of building services engineering.
- Provide an accessible starting point for students new to building services engineering, supporting a smooth transition into higher-level technical modules.
- Develop understanding of environmental design criteria that influence occupant comfort and system efficiency, including thermal comfort, lighting, air quality, and acoustics.
- Provide knowledge of how the building fabric and basic numerical methods (e.g., U-values, lux levels, airflow) are used to quantify comfort and energy-related variables.
- Familiarise students with key building services systems (mechanical, electrical, and public health) and their integration into overall design.
- Emphasise the role of health and safety, industry standards, and the interpretation of building services drawings in delivering safe, sustainable, and high-quality environments.

## Module Learning Outcomes

- LO1 Explain the key physical and environmental principles (thermal comfort, lighting, acoustics, air quality) that influence building services design.
- LO2 Analyse how sustainability, carbon reduction, environmental ethics, and energy efficiency considerations influence the selection and justification of building services systems.

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LO3 Interpret and apply basic environmental design data and comfort standards to a simple building scenario.

LO4 Describe the interaction between building fabric, form, and building services performance.

## Indicative Module Content

### Module topics

This section assumes varied prior knowledge and reinforces key concepts to ensure all learners develop a consistent foundation in environmental design and building services principles.

#### Foundations of Building Services

The module begins by introducing the professional context of building services and its role in creating safe, sustainable, and comfortable environments. Students then explore the key environmental design criteria—thermal comfort, lighting, air quality, and acoustics—before examining how the building fabric and heat transfer mechanisms (e.g., insulation, U-values, and airtightness) influence energy efficiency and performance.

#### Core Systems and Services

Attention turns to the primary systems that support building operation. This includes heating, ventilation and air conditioning (HVAC), followed by electrical systems such as lighting, power distribution, and safety features. Students also gain an understanding of water supply, drainage, and public health engineering, learning how these systems are designed and integrated within buildings.

#### Performance, Safety, and Integration

This theme focuses on the broader impacts of building services on people and compliance. Indoor environmental quality and occupant health are considered alongside the application of numerical methods to quantify variables such as illuminance, airflow, and heat gains. The importance of safety, legislation, and industry standards is also addressed, highlighting how compliance underpins safe and efficient design.

#### Applied Skills and Reflection

The final theme consolidates learning by emphasising applied skills in integrated design and coordination, particularly how different services interact with architectural and structural requirements. Students then develop practical ability in reading and evaluating building services drawings, before completing the module

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with a wrap-up that encourages reflection on the role of building services in delivering sustainable, high-quality environments.

## Overview of Assessment

Each module follows a progressive structure of **two summative assessments** designed to build confidence, competence and professional judgement.

**Assessment 1** is a computer-marked assessment (CMA) that provides early feedback and supports consolidation of core knowledge and principles. Positioned mid-module, it acts as both a confidence booster and a diagnostic opportunity to identify areas requiring further support, ensuring students are well prepared for the final assessment.

**Assessment 2** is an integrated applied task that develops professional competence and judgement through two complementary components.

### Part 1 – Developing Professional Judgement

Students interpret and communicate technical information using provided drawings, schedules and structured templates. They analyse well-defined engineering scenarios and present clear, concise technical responses. At this level, no original design production is required; evidence is demonstrated through mark-ups, brief technical commentary and completion of pro-forma documentation.

### Part 2 – Applied Professional Output and Reflection

Students produce applied outputs in authentic industry formats (e.g., technical specifications, compliance notes, risk assessments or structured reports). This component aligns with Senior Technician practice and End Point Assessment expectations, requiring clear, usable professional documentation suitable for real project contexts. A structured reflective element supports the development of professional judgement and readiness for progression.

<b>Module learning outcomes</b>	<b>Assessment</b>	<b>Word count or equivalent</b>	<b>Weighting</b>
LO1 & LO2	<b>Assessment 1</b> CMA	600 words equivalent	20%
LO1, LO2, LO3 & LO4	<b>Assessment 2</b> Coursework	2,400 words equivalent	80%

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## **Module Pass Mark (as a weighted average of all assessments): 40%**

Students will also be offered optional pre-course reading and self-assessment activities to refresh basic technical and mathematical skills before starting the module.

Students are encouraged to complete optional pre-course reading and diagnostic quizzes to familiarise themselves with key environmental and scientific principles prior to engaging with the module content.

## **Key Module Learning Resources**

### **Core Sources and Texts**

The core reading resources within each module will be provided via the specific Virtual Learning Environment (VLE) module pages and within the e-Library. Additional reference material and supplementary resources to support your studies are available through the University e-Library.

### **Module tools**

Students will have access to study materials, dedicated academic support, student forums, and learning activities via an online learning platform (VLE).

The module page on the VLE is broken down into structured study weeks to help students plan their time, with each week containing a mixture of reading, case studies, videos/recordings and interactive activities to go through. Online webinars/seminars led by the Module Leader can be attended in real time and provide opportunities to consolidate knowledge, ask questions, discuss topics and work through learning activities together. These sessions are recorded to support students who cannot attend and to enable students to recap the session and work through it at their own pace. Module forums on the VLE provide further opportunities to discuss topics with other students, complete collaborative work and get extra help from the module team.

Pre-course reading resources and short self-assessment quizzes are available via the VLE to help students prepare for the module.

### **Professional online resources**

The e-Library provides access to trusted, quality online resources, selected by subject specialists, to support students' study. This includes journals, industry publications, magazines, academic books and a dissertation/work-based library.

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For a list of the key industry specific and education resources available please visit [the VLE e-Library](#).

## Other relevant resources

Access is also provided to further information sources that include the British Library and Open University UK catalogues, as well as providing a monthly current awareness service entitled, **Knowledge Foundations** – a compendium of news, research and resources relating to the educational sector and the Built Environment.

The module resource list is available on the module VLE page and is updated regularly to ensure materials are relevant and current.